

## Fire Events Executive Summary

This report documents an analysis of fire events covering operating experience from 1986 through 1999 and characterizes the frequency and nature of the fire events.

This report updates the Office for Analysis and Evaluation of Operational Data (AEOD) report AEOD/597-03, *"Special Study, Fire Events - Feedback of U.S. Operating Experience,"* June 1997. An updated proprietary fire events database was developed from these sources as a basis for fire frequency analyses in this report.

This report identified the following summary of results:

- Despite the inclusion of small, short-duration fires excluded in the original report, the power operation fire frequencies for all locations were generally lower than the corresponding frequencies estimated in the initial report (1986-1994). The fire frequencies for power operation, shutdown, and total by plant location are summarized in Tables ES-1, ES-2, and ES-3, respectively.
- The number of fire events and associated fire frequencies by plant location were generally higher for shutdown than for power operation.
- For shutdown operation, no fires were reported for the cable spreading room or the battery room for the updated period, 1986-1999. For power operation, no fires were reported for the same locations for 1989-1999.
- The updated smoke events data (1995-1999) indicated that there were no smoke events where the extent of smoke was heavy. Only one smoke event involved an evacuation. It was due to carbon dioxide mixed with light smoke in the circulating water fire pump house.
- For power operation, small fires of short duration (less than 20 minutes) dominated. The majority of those small fires have a duration of less than 5 minutes (45%).
- For power operation fires, portable fire extinguishers were the major means of suppression (35%), with most of the remaining suppression means consisting of self-extinguished (18%) and power source removed (15%).
- Excluded from the scope of this study are:
  - A risk significance evaluation of the fire event data or the updated ignition fire frequencies. In fire risk assessments, the severities of the fire events are first evaluated, and the fire ignition frequencies are adjusted appropriately.
  - Fire severity, risk implications, and duration of power operation fire events were not updated from the initial study.

**Table ES-1. Power Operation Fire Frequencies by Plant Location.**

Plant Location	5% Lower Bound	Fire Frequency	
		Mean	95% Upper Bound
Containment	1.2e-05	3.0e-03	1.1 e-02
Reactor Building	1.1 e-04	2.8e-02	1.1 e-01

Plant Location	5% Lower Bound	Fire Frequency	
		Mean	95% Upper Bound
Aux. Building	1.0e-04	2.7e-02	1.0e-01
Turbine Building	1.6e-04	4.1e-02	1.6e-01
Control Room	2.8e-05	7.2e-03	2.8e-02
Cable Spreading Room	3.3e-06	8.4e-04	3.2e-03
Switchgear Room	2.0e-05	5.1e-03	1.9e-02
EDG Building	5.3e-05	1.4e-02	5.2e-02
SWS Pump house	2.8e-05	7.2e-03	2.8e-02
Switch Yard	7.0e-05	1.8e-02	6.8e-02
Battery Room	3.3e-06	8.4e-04	3.2e-03

**Table ES-2. Shutdown Fire Frequencies by Plant Location.**

Plant Location	5% Lower Bound	Fire Frequency	
		Mean	95% Upper Bound
Containment	8.93-04	2.3e-01	8.7e-01
Reactor Building	1.3e-03	3.3e-01	1.3e+00
Aux. Building	1.1e-03	2.8e-01	1.1e+00
Turbine Building	1.4e-03	3.6e-01	1.4e+00
Control Room	8.9e-05	2.8e-02	8.7e-02
Cable Spreading Room	1.3e-05	3.2e-03	1.2e-02
Switchgear Room	2.0e-04	5.2e-02	2.0e-01
EDO Building	2.4e-04	6.2e-02	2.4e-01
SWS Pump house	5.1e-05	1.3e-02	5.0e-02
Switch Yard	2.0e-04	5.2e-02	2.0e-01
Battery Room	1.3e-05	3.2e-03	1.2e-02

**Table ES-3. Total Fire Frequencies by Plant Location.**

Plant Location	5% Lower Bound	Fire Frequency	
		Mean	95% Upper Bound
Containment	1.9e-04	4.9e-02	1.9e-01
Reactor Building	3.7e-04	9.3e-02	3.6e-01
Aux. Building	3.0e-04	7.6e-02	2.9e-01
Turbine Building	4.2e-04	1.1e-01	4.1e-01
Control Room	3.8e-05	9.7e-03	3.7e-02
Cable Spreading Room	2.6e-06	6.6e-04	2.6e-03
Switchgear Room	5.6e-05	1.4e-02	5.4e-02
EDG Building	9.0e-05	2.3e-02	8.8e-02
SWS Pump house	3.0e-05	7.7e-03	2.9e-02
Switch Yard	9.5e-05	2.4e-02	9.3e-02
Battery Room	2.6e-06	6.6e-04	2.6e-03